Title Effect of controlled atmosphere, 1-MCP and preconditioning treatments in the development of physiological disorders in 'Honeycrisp' apples

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Abstract

'Honeycrisp' apple [*Malus sylvestris* (L.) Mill. var. domestica (Borkh.) Mansf.] fruit is susceptible to the storage disorders soggy breakdown, soft scald, bitter pit, lenticel breakdown and internal browning. The effect of atmosphere (in percent, $0_2/C0_2$ combinations of 1/0; 3/0; 1/3; 3/3;20.5/0.5; and 20.5/3), 1-MCP application (1 ppm in air storage only), and preconditioning (3 and 5 days at 20°C before storage in air) were studied. Apples from four different orchards were evaluated after 1, 3, and 6 months storage at 3°C. The treatments 1/3 and 3/3 yielded the highest incidence of internal browning. Also, the treatment 1/0 caused internal browning incidence in all orchards, although at a low rate. Regular atmosphere (20.5/0.5) treatments reduced or eliminated disorder incidence. 1-MCP and preconditioning did not enhance disorder development in air storage fruit. No treatment effect was detected for soft scald, bitter pit and lenticel breakdown incidence. Firmness, soluble solids content, and red coloration of skin were not affected by treatments. Background color was affected by controlled atmosphere leading to greener apples. 1-MCP reduced internal ethylene concentration (IEC), but had little effect on firmness. Preconditioning did not reduce firmness retention as has been previously reported.